THE HIGH SCHOOL JOURNAL

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Vol. XX **NOVEMBER, 1937** **No. 7**

*PHILOSOPHY AND TRENDS OF A MODERN BUSINESS EDUCATION PROGRAM**

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IN this subject which has been assigned to me, there are certain terms which I desire first to interpret. The first is the word *philosophy* which, in the sense of "a system of general beliefs or views," I shall consider in terms of the main objectives that are prevailingly held by leaders in business education. The second is the term *trends* which I shall use with the meaning of the particular directions in which business education in this country seems generally to be tending in this country. When we discuss a trend, it seems to me important for us to bear in mind that any tendency of things to be shaping in a given direction towards the future may not, at the same time, be actually describing what is prevailingly the present practice. Trends as such are merely indications of what *may be* characteristically true in the future course of events. Trends that become historically significant, as a matter of fact, in the building up and tearing down of great civilizations, begin and ripen over long periods of time. Such trends represent evolutionary epochs which outlive many generations.

The third term to which I wish to refer is that of *business education* or perhaps better expressed as EDUCATION for business. While the term *education* has many possible meanings, we like to think of it primarily as a process of continuous and guided growth in the power of a person and groups of people satisfactorily to adjust

* An address delivered before the School Superintendents' Section of the North Carolina Education Association, April 1937.

himself and themselves, individually and socially, to the desirable and inevitable life experiences. Among such experiences are a host of business activities both in the personal affairs of *all* persons and in the vocational careers of *certain* persons. We shall limit our consideration of such business experiences to the secondary school, which, in general, represents the guidance of youth through the adolescent period.

Major Objectives of Business Education

When we turn to the report of the N. E. A. Committee on Social-Economics Goals of America, we find that two of these ten goals represent points of emphasis in the secondary school program of business education.

The first is the goal for ECONOMIC SECURITY. While we appreciate that the Committee used the term, ECONOMIC SECURITY, in the sense of every person having "a right to a minimum income that will provide a reasonable standard of living," we submit that the legal provision of such a minimum carries with it the implication that it is an added obligation of the State to provide a form of public school education that will guide youths and adults in the ability to make wise use of that minimum income. In business education we frequently refer to this personal quality as *ability to manage money,* since it is usually through the use of money as a medium of exchange that we acquire business goods and services with which to gratify personal and family wants. This ability to make wise personal and family use of income represents a type of consumer business education or general business education with which we believe every youth and adult of our society should be equipped if ECONOMIC SECURITY is to become a practical reality.

The second goal mentioned by the N. E. A. Committee and which typifies another main objective of business education is that of SUITABLE OCCUPATION. "Everyone has a right to whatever joy the most fitting work can bring." The Committee refers to this goal as meaning for every youth "induction into and progress in a satisfying occupation." If education is really to mean to boys and girls and to young men and young women guided growth in power of adjustment to life experiences, must not the objective of a SUITABLE OCCUPATION FOR EVERY YOUTH be a major concern of public school administrators in helping to realize for the State an economic security for our democratic conception of government in human relations?

In an important National Conference on the Financing of Education, held in 1933 under the auspices of the Joint Commission on

the Emergency in Education of the N. E. A. and the Department of Superintendence, we find in their pronouncement of educational policies the following:

1. "Provide suitable education at public expense and require attendance from early childhood until employment is advisable and obtainable."
2. "Rehabilitate through public education the workers forced from a particular occupation."

Let us emphasize again that the provision of public education for a suitable occupation for every youth, if such education is to be made really significant to him, must be so planned and administered as to result in "induction into and progress in a satisfying occupation," and subsequently, for many persons, rehabilitation in as satisfying occupations as possible.

We have thus indicated that business education in relation to the whole program of public school education has two main objectives to serve: (1) that of contributing to the ECONOMIC SECURITY of every person through education or "guided growth" in wise handling of personal and family business affairs, and (2) that of contributing to the education or "guided growth" of those youths who may wisely seek in business employment suitable and satisfying occupations. However, in stressing these two main objectives of business education, we desire to say that in common with all school teachers we are likewise vitally concerned with those other educational goals by which we seek to guide youth in the power to deal happily and competently with a well-rounded and enriched life experience. In the same sense that business is a component part of our whole social experience, so should business education be a component part of the whole educational experience.

Trends in Broadening the Business Curriculum

We may consider trends in broadening the business curriculum in terms (1) of training for business occupational opportunities, (2) of broadening the social-economic background study of business, and (3) of providing training in wise handling of personal and family business affairs.

As a preface to our consideration of broadening the training opportunities for business, we wish to mention two important points:

1. There seems to be increasing agreement among school administrators that there should be provided in public school secondary education "a dynamic program of vocational education," as pronounced in the report of the Committee on the Orientation of Secondary Education of the N.E.A. Department of Secondary School Principals. While it is true that the

trend in entrance age of beginners in business employments has been toward an older age and greater maturity, it is likewise true that the vast majority of youth still enter business experience at the secondary educational level. Consequently, the problem of education for business occupations remains for youth mostly a problem of the public high school.

2. In a consideration of the opportunities of youth in beginning employments in business, we should weigh carefully their prospects beyond the initial jobs since such jobs represent mere points of departure to what may be properly thought of as business life-careers. Examples of such "initial jobs" are those of mail boy, messenger boy, file clerk, stock room clerk, office machine operator.

There are two trends which we wish to mention in the broadening of training for business employment at the high school age-level. The first is the introduction of an office practice course in the senior year, thus extending the present usual training for positions as typists, stenographers, and bookkeepers to those of various machine operators, as dictating, bookkeeping, calculating, duplicating; file clerk; various recording clerkships, as statistical, cost, shipping, stock, cashier; switchboard operators; and, of course, various combinations of these and other clerkships in what is called a general clerk.

The second trend in broadening the occupational training is for merchandising or distributive occupations. It is widely recognized that if proper training programs can be provided in secondary schools for this major field of business occupational experience, vocational opportunities can be more appropriately offered for many high school youths for whom the present restricted stenographic and bookkeeping program is not suitable.

The broadening of the business curriculum by incorporating a few courses dealing with a social-economic background study of business is a third developing trend of major importance. Such courses are frequently referred to as *social-business* with much looseness of meaning being attached to the term by many writers in business education. By a social-economic background study of business we mean a viewing of business as a type of economic organization or social institution by which we are mostly provided with those economic goods and services which we buy to satisfy our wants and desires. Business enterprise, when we regard it in this light, as one writer has expressed it, "is as socially significant as want-gratification." There is increasing evidence that sound social policies are being regarded by business leaders as sound business policies. James O. McKinsey, Chairman, Board of Directors, Marshall Field and Company, has

recently declared that to him the time has come when business leaders "must recognize that rights and responsibilities are inseparable. If those engaged in business activities desire to maintain any semblance of economic freedom, they must accept the responsibility of alleviating those conditions which make it possible for the demagogue to gain control and establish unreasonable restrictions over economic activities . . . . that there will be an increasing opportunity to earn profits as a result of constructive thinking on how to render a more efficient service as a part of a voluntary, co-operative, competitive, industrial organization where business leaders have become sufficiently intelligent to realize that from a long-run point of view there is nothing antagonistic between public welfare and individual welfare."

It seems to me that this trend in social-thinking and social-behavior of business owners and managers in both small and large businesses, even though the trend may not appear very pronounced at times, should be much more frequently recognized by school administrators and teachers in their community and school relations. There is too much of a tendency to think of business as anti-social. To discover that that view is mostly not true, we have but to consider the successful business men and women in our home communities—those who are our neighbors and have lived in the communities for many years, trying to render an honest and faithful service. It is to such men and women as these that we need increasingly to direct the attention of our students in our study of business and its social-economic services rather than unduly stress the evils of business enterprise in terms of the faker, the plunger, the exorbitant profit-maker who rightly deserve our utmost scorn.

A fourth trend in broadening the business curriculum is that of providing training for *all* students in wise management of personal and family business affairs. Such personal business training may involve a study of money and its substitutes, the judging of real values in terms of money values as in problems of buying, a knowledge and use of business forms, business correspondence, travel, communication, commercial banking, investments, thrift. In the handling of such and other business affairs, frequently the personal use of certain business techniques may be valuable, as those of typing, filing, shorthand, bookkeeping. Such personal-use adaptation of these and other business techniques should mean a considerable simplification of them as constrasted with their use in business concerns, and consequently much less time will be needed to learn them by a large group of business students.

There should accompany such business education for everybody a similar social-economic study of business as we have already suggested as background study for specific training for business occupations. There should be included in the general education of every student a practical understanding of the economic nature of business endeavor, and of its various activities as those of marketing, financing, and risk-bearing.

To be sure much of such business education for everybody is already included in the usual high school program of studies, being scattered in a rather heterogeneous fashion among many different courses. As a Chicago principal recently declared, "The policy of business education for all is definitely established. The big problem is how is it to be incorporated into the curriculum?"

Trend in Guidance of Business Students

The problem of guidance is a central one in business education, particularly with reference to vocational guidance—selection of those students who may properly enroll in various lines of training for business occupations, their thorough preparation for entrance into available business employments, and their subsequent placement, follow-up, and necessary training adjustments.

A fifth trend of great importance in this connection is that in the field of vocational ability tests. The Business Education Council of Metropolitan Boston, the National Office Management Association, and the Eastern Commercial Teachers Association have been cooperating in a two-year undertaking, "the outcome of which is to be a series of vocational ability tests which will bridge the gap between school training and initial office employment." These tests include stenographic ability, typing ability, bookkeeping ability, English fundamentals, personality rating, filing ability, machine clerical ability, machine transcribing. This work is being conducted under the leadership of Professor F. G. Nichols of Harvard University, and is extensively reported in the 1937 yearbook of the Eastern Commercial Teachers Association, 1200 Walnut Street, Philidelphia, Pennsylvania.

Trend in Establishment of Better Relations between School Leaders and Business Leaders[1]

It would seem obvious that business education is first, last, and always primarily a study of business. To make such a study functional in the experiences of our students would also seem obviously a matter of maintaining close cooperative relations between school

[1] Note the article by Edwin A. Lee, "The School Challenges Business and Industry" in the March, 1937, issue of *Occupations*—The *Vocational Education Magazine*, pp.485-8.

leaders and business leaders. A sixth trend of much significance in this connection is an arrangement worked out between Kiwanis International and the National Council of Business Education, an affiliation of thirty-six associations of business teachers, representing more than 15,000 membership. The purpose of this arrangement with Kiwanis International is to bring about in the local service clubs active collaboration of business leaders and school leaders in a study of the local programs of business education. It is the hope of the National Council of Business Education to extend this kind of collaboration to other service clubs and associations of business men and women. In this highly important get-together of the local school and business communities, naturally the superintendents of schools represent the key liaison officers. In my judgment, there are at least two good reasons why the public school superintendent should be a competent leader of business education. The first reason is that he tends to be, by the very nature of his administrative duties, most actively in touch with the business leadership of the community, which is frequently represented on his board of education. The second reason is that the superintendent of schools, as the executive officer of the board of education, is usually chiefly responsible for the business management of the school system. Often the local public school system constitutes the biggest single business undertaking of the community. The North Carolina Department of Superintendence, as manifested in this meeting, has already taken the excellent initiative of exercising leadership of business education in cooperation with the business teachers of the state. In that, you have set an example which might well be followed by other state associations of education.

Trend in Business Teacher Training and Professional Advancement

It is gratifying to be able to report that the new business teachers who are entering the profession of education are tending to be as well prepared as are the teachers of the so-called academic branches. This is a very significant seventh trend. In many states the certification requirement is at least the baccalaureate degree with definitely prescribed preparation in the subject matter and special methods of the teaching specialization. In at least two states the requirement for permanent certification extends to the equivalent of the master's degree. Not only are the new business teachers tending to be relatively well-equipped, but the teachers in service are widely availing themselves of opportunities for professional improvement.

This admirable spirit of alertness to improved competency is

(Continued on Page 279)

SEX DIFFERENCES IN MENTAL TRAITS

A. M. JORDAN
University of North Carolina

MOST high schools in the United states and practically all in North Carolina teach boys and girls in the same class. This procedure is based on the assumption that girls are as able as boys to learn whatever the modern high school teaches. This assumption has in general been proved to be correct as evidenced by the fact that the general intelligence of boys and girls as measured on a large number of tests, and their scores on achievement tests, have been proved to be about the same. There are, however, numerous traits in which reliable differences appear between boys and girls. I believe these differences are worthy of notice. This paper, then, reviews some of the more or less well demonstrated differences in mental traits between high school boys and girls and also presents some new data collected from the records of North Carolina high school seniors on the North Carolina High School Senior Examination which was given in 1935.

High School boys and girls differ in their reading interests. Boys like adventure better; girls, romantic fiction. The present writer has obtained the expression of over 5000 boys and girls on the question of their preferences for books and magazines. The greatest differences occur at the ages of 12-13, at which age 6 per cent of boys and 33 per cent of girls express themselves in favor of adult fiction. On the other hand, 64 per cent of boys and only 17 per cent of girls express themselves as liking books of adventure best of all. These same differences continue throughout the high school but in a lesser degree. In a questionnaire given to the students of Charlotte and Greensboro (N. C.), girls liked best (in 1926) such books as *Girl of the Limberlost, Little Women, Pollyanna, Freckles, Anne of Green Gables;* boys preferred *Boy Scout Series, Call of the Wild, Treasure Island, Tom Sawyer,* and *Tarzan Series.* Both boys and girls liked Zane Gray's works. There are, of course, boys who like very much adult fiction and girls who enjoy adventure, but the great majority show these differences.

There are also demonstrated differences in the field of language. Hardly has there been a language trait accurately measured in two comparable groups which did not show a definite superiority in favor of the girls. Girls surpass boys in word knowledge, building of several shorter words out of the letters of one longer word, on

English composition, and on school marks in the field of the languages. In writing compositions, for example, girls write longer compositions and use longer sentences than boys of the same age. Girls also are said to day-dream more and to have more "crushes" on other girls than boys have on other boys.

Boys, on the other hand, are more successful in science than are girls. Boys make better marks on the school subjects in this field, and on tests of scientific information. They read more magazines of science, such as *Popular Mechanics* and *Popular Science,* than girls do. Girls spend much of their reading time on *Good Housekeeping, Ladies Home Journal, McCall's,* etc. Boys also score a little higher on mathematics tests, though the differences here are not large. They are definitely better on tests of mechanical ability. There are about three times as many speech defects, such as stuttering and stammering, in the case of boys, and about three times as many boys who are color-blind as girls. Boys are not quite as apt to be misled by false suggestions as girls are. In physical traits boys surpass girls in quickness and strength, and in their interest in competitive, vigorous games.

The Present Study

During the winter of 1935 more than 19,000 seniors in the North Carolina high schools took the North Carolina High School Senior Examination, a test constructed and administered by a committee representing the North Carolina College Conference. This test was made up of seven different parts: literature, two tests of reading, English usage, mathematics, general science, and American history. There were twenty-five items in each division of the test (of the multiple-answer type). The committee attempted to select those items which represented typical experiences of the high school students. The literature test consisted of placing properly books, characters, and quotations. For example, *"The Cotter's Saturday Night* was written by (1) Burns (2) Emerson (3) Whittier (4) Longfellow (5) Whitman." The two reading tests were carefully phrased questions about complicated paragraphs: the one, from Carlyle, bearing on the uselessness of war; the other, from Wertenbaker's "The First Americans." The test on English usage consisted of 25 sentences, which had to be analyzed and their correctness or incorrectness judged. For example, *"Tell everyone to lock their locker with a new combination.*—This sentence (1) is correct (2) lacks agreement between pronoun and its antecedent (3) lacks agreement between subject and verb (4) has pronoun in incorrect case (5) has incorrect verb form."

In the mathematics test there were 25 items selected from algebra and geometry. An illustration follows: "The simultaneous solution of the equations, $x + y = 10$ and $x - y = 4$ is (1) $x = 7$, $y = 3$ (2) $x = 5$, $y = 5$ (3) $x = 10$, $y = 6$ (4) $x = 3$, $y = 7$ (5) $x = 9$, $y = 1$." In a like manner materials common to the courses usually taught under the captions of general science and American history were presented respectively in the two tests representing these fields.

The test as a whole consumed more than an hour and a half of the student's time and had satisfactory statistical reliability. It can well be said that a person who answered these questions as best as he could had a large part of his high school course sampled. For this reason, the test may be regarded as a standardized examination which markedly correlated with the actual standings of students in their courses of instruction.

The average scores of these graduating high school boys and girls differ very little (Table I).

Boys' average score is 82.9; girls', 80.1. The difference of 2.8, while small, is reliable (S. D. diff. = .289). Boys also have a slightly larger per cent of very high scores. Whatever the cause, the 8000 boys taking this test scored slightly higher than the nearly 11,000 girls. The ratio of boys to girls at birth is 106 to 100, and through the first five grades of the elementary school the ratio of boys to girls is 105 to 100. It is thus apparent that many more boys than girls have dropped out of school. While the evidence isn't conclusive, some students believe that more bright boys than girls drop out and go to work. But neither of these populations represents the total of either sex. Cole, in her book on the Psychology of Adolescence (p. 192), reports that of all the 16-year old girls about 65 per cent are in high school, 5 per cent are in junior high school, 5 per cent are married, 1 per cent is in college, 1 per cent out of school on account of ill health, 3 per cent are defective or in institutions of some kind, and the remaining 20 per cent are working. Whether or not our 11,000 represent 65 per cent of the total girls in the state of that age is not certain, but the probabilities are that about 65 per cent are represented. The per cent of total boys is very uncertain. It is evident, then, that the conclusions we have reached apply only to the results of the tests as given, sometimes not under the best conditions, to those present at school on one day in 1935. The one thing to be remembered in this connection is that there was no distinction made between the way the tests were given to the boys and to the girls.

While the boys were slightly ahead, there was an enormous

TABLE I. *Total Scores of Boys and Girls on the North Carolina High School Senior Examinations.*

	Boys	Girls
150	3	....
145	13	7
140	16	18
135	48	40
130	72	68
125	96	116
120	136	170
115	207	266
110	297	340
105	367	474
100	439	517
95	526	709
90	605	817
85	669	963
80	727	1,009
75	769	1,078
70	689	1,057
65	645	978
60	567	809
55	472	625
50	286	435
45	179	240
40	100	147
35	49	65
30	19	20
25	7	3
20	3	2
Total	8,006	10,973
Mean	82.90	81.65
S. D.	21.05	20.15

overlapping of scores (Table I). This table makes clear that at every step there are a great many scores of both boys and girls. At 145, for example there are 13 boys and 7 girls, while at 55 there are 472 boys and 625 girls. This means that hardly a boy's score exists which might not be equalled or surpassed by a girl's score.

The inspection of Table II displays in some detail the difference between boys and girls on the seven sub-tests used in our investigation.

The means (or averages) of these divisions show almost no differences between boys and girls on literature and reading, but in the others there are some small differences. Let us consider English usage. In this sub-test there is a reliable difference between boys and girls. Girls are ahead 1.71 points. This fact agrees well with facts already known about sex-differences in language. Many studies have shown that girls talk earlier and perhaps more, that they write

TABLE II. *Scores of Boys and Girls on the Different Sections of the North Carolina High School Senior Examination.*

A = Boys B = Girls

TEST	LITERATURE		READING I		READING II		ENGLISH USAGE		MATHEMATICS		GENERAL SCIENCE		HISTORY	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
25	2	7	307	266	1	.....	.....	18	.....	.....	4	2	1	1
24	12	21	304	374	4	5	15	35	5	4	5	4	1	5
23	23	31	286	348	7	14	25	73	3	8	16	11	9	17
22	48	66	325	394	29	33	29	114	11	12	61	27	35	34
21	79	107	328	445	59	74	46	148	20	14	122	52	74	65
20	128	209	361	495	138	175	79	215	22	20	200	110	133	97
19	219	268	361	514	218	318	106	244	40	31	306	194	230	187
18	302	381	381	645	333	428	137	262	46	46	433	299	308	308
17	437	551	439	671	457	693	122	351	87	84	581	485	413	377
16	536	714	447	722	554	901	211	409	81	84	677	631	573	517
15	687	897	479	799	809	1,202	204	446	110	119	845	871	627	734
14	771	1,067	539	834	820	1,321	290	510	173	142	908	1,043	647	830
13	832	1,112	511	801	942	1,267	294	619	211	233	856	1,180	741	919
12	783	1,109	517	773	829	1,174	368	671	278	298	799	1,187	736	1,004
11	757	1,106	535	695	752	1,049	428	698	391	457	685	1,275	744	1,016
10	673	1,003	451	647	587	729	570	843	541	533	555	1,090	654	1,006
9	496	802	414	506	484	569	596	907	653	712	378	878	597	1,022
8	423	617	355	391	320	361	742	906	777	920	253	686	498	850
7	344	409	279	288	246	287	791	937	862	1,126	145	496	355	707
6	199	244	178	187	153	151	894	925	925	1,257	91	234	265	564
5	140	152	104	103	135	105	834	719	936	1,387	45	133	184	350
4	67	68	44	50	59	55	607	506	815	1,278	19	52	113	201
3	35	25	28	16	34	31	369	258	523	1,115	13	24	48	101
2	13	8	13	11	26	22	172	119	309	674	2	9	13	43
1	4	1	7	2	4	9	61	28	144	309	3	3	4	14
0	4	4	10	.....	4	2	13	16	45	113	4	2	4	8
N=	8,004	10,970	8,003	10,977	8,004	10,975	8,003	10,977	8,008	10,976	8,006	10,978	8,007	10,977
Mean	13.07	13.06	15.44	15.52	13.28	13.61	9.26	10.97	7.92	7.09	14.16	12.51	12.73	11.75
S.D.	3.86	3.75	5.46	5.00	3.68	3.46	4.48	4.88	3.83	3.71	3.55	3.44	3.98	3.95

longer and better compositions in school, and that they make higher grades on English courses or on any other language course. One generalization seems to be warranted from all the extant data: that girls are superior to boys in language ability. But this superiority does not preclude over-lapping. Suppose we take the average of 10.97 for girls on English usage and apply that to the corresponding distribution for boys. What per cent of boys stand above it? There are 2372 boys or 29% of the total, above the girls' average of 10.97. We sometimes say it like this: 'Twenty-nine per cent of the boys reach or exceed the median girl'.

Another way to study the differences between boys and girls on English usage is through Table III.

TABLE III. *Percentages for Each Grade on English Usage Test.*

Grade	Score	Boys	Girls
A	19 and above	3.74	7.71
B	15 — 18	8.42	13.37
C	5 — 14	72.56	70.46
D	1 — 4	15.10	8.29
E	Below — 1	— 0.16	— 0.14

In this table A, B, C, D, E represent divisions of the total scores into five divisions determined by the standard deviation technique.[1] Two or three per cent of the cases are expected for A and E each; 13 to 14 per cent for B or D; and about 68 to 70 per cent for C. We establish the points first on the boys' scores then apply them to the girls'. From these computations one sees twice as many girls as boys making A; fifty per cent more making B, about the same making C, about half as many making D, and practically the same number making E. These divisions make very clear the superiority of the girls in scores on the test of language usage.

Boys surpass girls on the tests of mathematics, general science, and history. The differences in the case of mathematics and history are not large, but the difference looms much larger in general science. If we apply the boys' average of 14.16 in the general science test to the girls table of distribution we discover 3562 girls above the boys average. This constitutes 32 per cent of the girls. If the groups were just even this thirty-two percent would be 50 per cent. Boys are then slightly better than girls on our test of general science information. Another table of letter scores (Table IV) gives a little different slant to this same question.

Boys score more than twice as many A's and B's and about half as many D's and E's as girls.

TABLE IV. *Percents for Each Grade on General Science Test.*

Grade	Score	Boys	Girls
A	22 and above	1.07	0.40
B	18 — 21	13.25	5.96
C	10 — 17	73.76	70.70
D	7 — 9	9.69	18.76
E	Below — 7	2.21	4.16

[1] By this technique one computes the standard deviation of a table of distribution and then applies this as follows:—The mean ± 1 standard deviation is C. In a normal probability curve this includes 68.26 per cent of cases. One standard deviation above the upper limit of C is called B; one below the lower limit, D. One standard deviation above the upper limit of B is called A; one below the lower limit of D is designated E. In a normal curve we get A and E = 2.14 per cent each, B and D = 13.59 per cent each, and C = 68.26.

These findings again agree with other studies on this subject. There is no disagreement at any place. Boys score higher on science tests and make better school marks on science than girls do.

In mathematics, boys are slightly ahead of girls. About 35 per cent of the girls reach or exceed the median of the boys. Both boys and girls score very low on this test of mathematics. The median for the boys is 7.92; for the girls, 7.09. In Table V the letter scores are again presented. Boys make about 50% more A's and B's and about one-half as many E's as girls do.

TABLE V. *Percents for Each Grade on Mathematics Test.*

Grade	Score	Boys	Girls
A	17 and above	2.92	1.99
B	12 — 16	10.65	7.98
C	4 — 11	73.67	69.87
D	1 — 3	12.18	19.11
E	Below — 1	0.56	1.02

In *American history* boys score about 40% more A's and B's (table VI) than girls do and about 40% fewer E's. The boys score almost one point ahead of the girls on this history test.

TABLE VI. *Percents for Each Grade on American History Test.*

Grade	Score	Boys	Girls
A	21 and above	1.49	1.11
B	17 — 20	13.53	8.82
C	9 — 16	66.42	64.20
D	4 — 8	17.67	24.34
E	Below — 4	0.86	1.51

These results, too, are quite like those discovered by other workers. Most writers attribute this difference to the greater interest of boys in fighting and action, which usually appear very frequently in our histories. In reading and literature the differences are negligible.

SUMMARY

An examination lasting nearly two hours and consisting of questions on reading, literature, English usage, history, science, and mathematics was given to about 19,000 high school seniors in the State of North Carolina. Of this number, there were about 11,000 girls and 8,000 boys. The records of these girls and boys have been studied and comparisons made between them. High school boys are slightly ahead on the test as a whole. They surpass girls also in their scores on mathematics, science, and history. Girls surpass boys in their

scores on English usage. In the records in reading and literature there are hardly any differences. Only 20 per cent of the boys reach or exceed the median girl in scores of English usage. Twice as many girls as boys make the highest scores. In science only 32 per cent of the girls reach or exceed the median boy. Boys, on this test, score twice as many A's as girls and about half as many of the lowest scores. In mathematics about 35 per cent of the girls reach or exceed the median boy. Boys make about 50 per cent more A's and B's and about half as many E's as girls do. In American history boys score about 40% more A's and B's and about 40% fewer E's than girls do.

It is clear that while there are some differences between boys and girls these differences are small. Girls are as able as boys to perform the intellectual problems incident to high school work.

Discussion

Our findings are significant because they are gathered from such a large number of cases—8000 boys and about 11,000 girls—from quite homogeneous populations. All of the students are white—Anglo-Saxon, a few Germans, less than one per cent of Greeks, Italians, etc.—English speaking, in general, from parents who have lived in the United States for four or five generations or more. These high school seniors come from the rural consolidated schools, small towns, and a few cities of 50,000 or upwards. They have had the usual history of elimination of more boys than girls. All of them except for a few in two of the larger cities have come through seven years of elementary school and four years of high school.

Why these differences appear can only be guessed. One might look for a moment at the genetic constitution of the two sexes. Femaleness is produced by twenty three pairs of ordinary chromosomes and 2 X-chromosomes. Maleness, on the other hand, requires 23 pairs of chromosomes, an X-chromosome and a Y-chromosome. Now, since the fertilized cell is different in boys and girls at the beginning, all the cells derived from the original cell are also different. Among these cells which might make much difference in mental development are the brain cells. Or one might seek an explanation of these differences in environmental factors. However caused, these differences are present and have to be taken into consideration in adjusting teaching procedures to individual needs.

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TRIUMPHS OF EUCLIDEAN GEOMETRY

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"When the time comes that knowledge will not be sought for its own sake, and men will not press forward simply in a desire of achievement without hope of gain to extend the limits of human knowledge and information, then indeed, will the race enter upon its decadence."—Charles Evans Hughes, 1910.

THE STORY of geometry must ever be associated with the interpretation of nature and the evolution of the human race. This becomes more apparent as we extend our knowledge of forms or study the principles underlying scientific achievement.

The first great geometer was Thales (639-546 B. C.), one of the seven wise men of Greece. Having made a fortune in business enterprises, he devoted himself to the study of mathematics and astronomy. He reduced geometry to a science, developed the method of triangulation for finding distances, observed the sun's sweep across the heavens from year to year, discovered the solstices and the equinoxes, found the sun and moon to have nearly the same angular diameter, and explained that an eclipse of the moon occurred when the earth intercepted from it the sun's rays.

He predicted the eclipse of May 28, 585 B.C., which leads us to believe that he was not only a geometer of merit but that he was also a close student of the heavens. There is a legend that once while stargazing he fell into a well. For this he was taunted by a maid-servant for being so eager to know what was going on in the heavens that he could not see what lay at his feet.

During the next three or four centuries the science of geometry was brought to a high degree of perfection. Then came a succession of applications yielding results that were and still are the wonder and admiration of the human race.

Following Thales, the first great triumph in point of time was achieved by Aristarchus of Samos (310-230 B.C.), called the Copernicus of antiquity. He taught that the earth was a sphere out in space, and endeavored to substantiate this contention by three main facts:

1. During a lunar eclipse the earth's shadow on the moon is always circular.
2. While one is traveling, the inclinations of the stars increase in the direction of travel and decrease in the opposite direction.
3. The hour of an eclipse as recorded in India, Egypt, and West Africa always differed.

Use of the Right Triangle. About 270 B.C. he endeavored to

find the relative distance of the sun and moon by means of a right triangle. At the moment when the moon was estimated to be half full he measured the angle MES, that is, the angle between the directions of the moon and the sun as seen from the earth. This angle he found to be approximately 87°. From the ratio of the lines ES and EM he found the sun to be approximately 20 times as far away as the moon. Since the angular diameters of the sun and moon are nearly equal, and since "the volumes of similar solids are to each other as the cubes of their like dimensions", he computed that the volume of the sun was approximately 8000 times the volume of the moon and several hundred times the volume of the earth. The relative volumes of these bodies as determined by this measurement indicated that the sun and not the earth was the center of the system. Thus we see that the simple application of two geometric theorems pointed rather conclusively to the heliocentric theory and gave some idea of the relative distances of the heavenly bodies. This was a great step forward, for it placed the heavenly bodies at different distances and changed the scientific idea of the heavens from "flat land" to space of three dimensions.

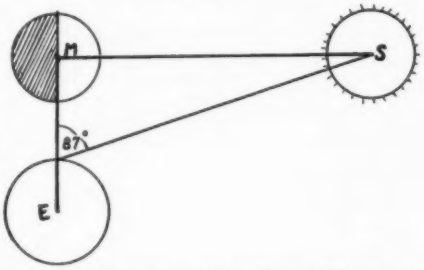


FIG. 1. Aristarchus finds relative distances of sun and moon.

The second great set of triumphs is found in the work of Eratosthenes (275-194 B.C.). He was the royal librarian at Alexandria and a genius of high order. His contemporaries jestingly called him Beta, meaning the second, because he was said through the universality of his attainments to be a "second Plato" in philosophy, a "second Thales" in astronomy, and so on through the list of achievements.

Obliquity of the Ecliptic. By measuring the angle between the sun's rays first at the time of the summer solstice and then at the time of the winter solstice he found the angular distance between the tropics to be 47° 42′ 39″. One half of this angle, namely 23° 51′ 20″, represented the obliquity of the ecliptic. This measurement was within 21′ of the correct value, and

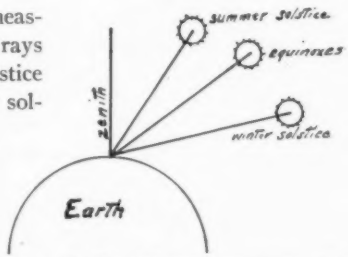


FIG. 2. Eratosthenes measures the obliquity of the ecliptic.

meant that the determination of the "obliquity of the ecliptic" rested on the measurement of a single angle. Since at Alexandria the rays of the sun at the time of the summer solstice made an angle of 7° 12′ with the vertical, by adding 7° 12′ to the inclination of the ecliptic, he found the latitude of Alexandria to be 31° 3′. Modern geography locates Alexandria at 31° 12′, a difference of 9′ in angular measurement or about 10 miles in linear measurement.

The Circumference of the Earth. To find the circumference of the earth, the distance from Alexandria to Assuan in Egypt was measured, and found to be 5,000 stadia or about 500 miles. By angular measurement he found that, at the time of the summer solstice, when the sun's rays were vertical at Assuan they made an angle of 7⅕° with the vertical at Alexandria. Because of the sun's great distance it was evident that the rays of the sun at the two locations were sensibly parallel. He knew from the theorem, "If two parallel lines are cut by a transversal, the alternate interior angles are equal," that the angles marked ∝ (See Fig. 3) were equal. That is, the angle at the center of the earth subtended by an arc of 5000 stadia was 7⅕°. He also knew that, "In the same circle central angles are proportional to their intercepted arcs." From these data he reasoned that since 7⅕° equals ⅛₀ of 360°, 5000 stadia was ⅛₀ of the earth's circumference. Using Heath's estimate of the length of a stadion, this measurement gives for the circumference of the earth 24,662 miles, a distance which is only about 1% in error. This measurement of the earth's circumference was a notable triumph, and can be compared only with the attempt of Aristarchus to measure the relative distances of the sun and moon. Hence from the measurement of an angle and from the application of two geometric theorems, this amazing genius, endowed with a creative imagination, measured the inclination of the plane of the ecliptic, which is the principal cause of the seasons, and determined the circumference of the earth. This was the third application of pure geometry in the attempts to interpret the solar system.

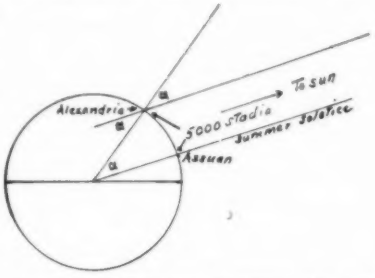


FIG. 3. Eratosthenes measures the size of the earth.

The above named theorem is the basis of all radian measure, first used about 1873, and now commonly used in mechanics, surveying, and in finding the diameter of the sun, a planet, or a nebula when the distance away is known.

The next great advances are contained in the work of Hipparchus

(190-120 B.C.), the lover of truth, the Tycho Brahe of antiquity. He is credited with determining the length of the year within 12′, and of discovering the eccentricity of the earth's orbit. Possibly his most notable achievement was the measuring of the distance to the moon by means of similar triangles. Since the sun and the moon had nearly the same angular diameter as seen from the earth, the length of the moon's shadow was very nearly equal to the moon's distance from the earth. By measurement, during an eclipse of the moon, it was found that the radius of the earth's shadow at the point at which the moon crossed it was to the radius of the moon as 40′ was to 15′. Then from the theory of similar triangles, aided by the above data, he determined that the distance to the moon was approximately 59 times the radius of the earth. Today we give this distance at 60 times, or more accurately, 60.27 times the radius of the earth. This measurement placed the moon at 240,000 miles and the sun at 5,000,000 approximately. Thus by 100 B.C. the Greek Mathematicians had established the heliocentric theory, measured the circumference of the earth, the obliquity of the ecliptic, and the distance to the moon, and had made a first approximation of the distance to the sun.

In art and architecture, according to Plato, the most beautiful triangle is the particular right triangle which is itself one-half of an equilateral triangle. From this triangle one readily constructs the equilateral triangle, the rectangle, the parallelogram, the diamond (rhombus) and the regular hexagon, as well as three of the five regular solids, namely, the tetrahedron, the octahedron, and the icosahedron. One reason for these geometric figures being so common in art and architecture is that there are only three regular geometric figures the angles of which respectively may be used to fill the space about a point in a plane, namely, the triangle, the rectangle and the hexagon. These figures in various combinations give rise to much that is beautiful in art and architecture in the way of pleasing proportions as well as balance and symmetry.

Among the quadrilaterals the square is very common in art. Second only to the square is the "golden rectangle" whose length is 1.6 times its width. For the so-called most artistic ellipse the ratio of the major to the minor axes is 5 to 3, that is, the ratio is 1.66 or almost the same as that used in the rectangle.

In art an underlying principle is perspective. But perspective is determined by a quadrilateral construction. It is perspective that distinguishes the art of Leonardo da Vinci (1452-1519) and other great European painters from that of Asia and Egypt. In the latter countries, where perspective is unknown, the art is flat and unattractive.

Neither art nor architecture without a geometric background for balance and perspective is likely to be acceptable.

About 1600 A.D. Galileo was experimenting with falling bodies and projectiles. He found that the distance a body fell varied as the square of the time of falling, and that the path of a projectile was a parabola. To determine the heights of the mountains on the moon he used the theorem, "If from an external point a tangent and a secant are drawn to a circle, the tangent is a mean proportional between the whole secant and its external segment." Today this theorem is used to determine the radius of the area that can be photographed from an airplane or a balloon when the height of the point of observation is known. The formula used is, height x diameter of earth = square of distance visible. By this formula Galileo estimated the heights of some of the mountains on the moon to be nearly four miles, which corresponds quite closely to recent measurements.

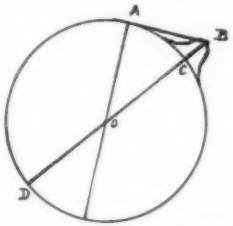


FIG. 4. Galileo measures mountains on the moon.

A near contemporary of Galileo was Kepler, who had faith that the universe was built on some geometrical plan. After having tried and discarded 19 different hypotheses, he succeeded in proving the correctness of the twentieth, namely, that the orbits of planets are ellipses.

It is by his third law, "The cube of the mean distance of a planet varies as the square of its period of revolution," that having determined the distance to a planet, as Pluto, one can compute in a few minutes the period of revolution. The mean distance assigned to Pluto is 39.6 astronomical units. Consequently $P^2 = a^3 = (39.6)^3 = 62099$. Hence P (the period) = 249 + years. On the discovery of this law Kepler was greatly elated, and expressed himself as follows: "The die is cast; the book is written, to be read either now or by posterity, I care not which. It can await its readers. Has not God waited six thousand years for an observer?"

The three laws of Kepler and the experiments of Galileo laid the basis for a new celestial mechanics quite at variance with the ideas of Aristotle or Plato's demand for uniform circular motion, and opened up a new world of thought and intellectual delight. In the words of Emerson, "The astronomer discovers that geometry, a pure abstraction of the human mind, is the measure of planetary motion."

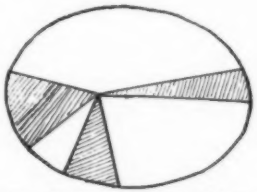


FIG. 5. Kepler's second law: The radius vector sweeps over equal areas in equal intervals of time.

The works of Galileo, Kepler, and Newton had quite fully established the idea of natural law. After two and a half centuries of experimenting the law of universal gravitation has come to be looked upon as the fundamental law governing bodies in space, at least to the extent of 100 billion bodies on the average as large as the sun and extending in every direction at least 300 million light years. The establishing of the law of universal gravitation was probably geometry's greatest triumph.

A little later, Halley, a mathematician of unusual ability and the Astronomer royal of England, suggested that possibly comets (the celestial tramps) obeyed the law of gravitation. In the course of time it was found that the orbit of a comet was, when it returned, an ellipse and when it did not return, a parabola or hyperbola. The comet now known as Halley's comet returns every 75 years and will long remain a memorial to the mathematical genius of this great man. These discoveries, all of which have a distinctly geometric background, lead to the idea of the orderliness of nature and of a science based on natural law which has almost wholly replaced astrology and chaos of thought. With the work of Kepler, Halley, and Newton the conic sections of Apollonius came into their own.

Velocity of Light. About 1675 Roemer (1644-1710), who later became a professor of mathematics and astronomy in the university of Copenhagen, read a paper "On Successive Propagation of Light as Revealed by a Certain Inequality in the Motion of Jupiter's First Satellite." He had observed that at certain times of the year each occultation of this satellite lagged some 15 seconds behind its calculated time. He knew that between two successive occultations the earth had time to move along its orbit some 2¾ million miles. He interpreted this phenomenon to mean that light had a finite velocity, but his explanation was not accepted, and the half-made discovery was temporarily shelved as a brilliant but unverified speculation. When, later, its truth was demonstrated, it immortalized the name of Roemer, and aided in more firmly establishing the idea of orderliness in the universe. Roemer's discovery must ever be considered remarkable, since he had only a long telescope, a clock, and the inner satellite of Jupiter for his experiment.

(Continued on Next Page)

It costs each adult twenty-one years of age and over only seven cents a day for public education in the United States.

Roemer's measurements indicated that the occultation occurred about 22 minutes earlier when the earth was at E than it did when the earth was at E'. Fifty years later, Bradley of England found that the occultations of this inner satellite occurred 16 minutes, 37 seconds later when the earth was on the side of its orbit away from Jupiter than when it was on the same side. Taking the diameter of the earth's orbit as 186,000,000 miles it was found that light had a finite velocity of 186,000 miles per second. Thus once again the geometry of Euclid had played an important part. This time it had aided in establishing a fairly accurate velocity for ether waves.

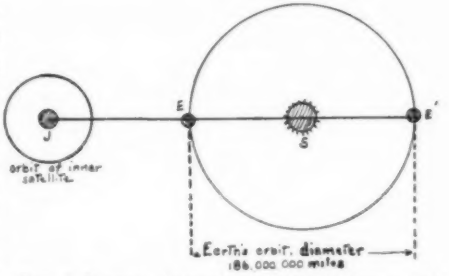


FIG. 6. Roemer determines that light has a finite velocity.

Distance to the Moon, Trigonometric Method. To determine the distance to the moon, a base line is taken on the earth, namely AB. Suppose A is Greenwich, England and B is Cape Town, South Africa. C is a point on a crater of the moon. The length AB is known and the angles at A and B are measured. Hence the distance CA is readily obtained by the law of sines in trigonometry.

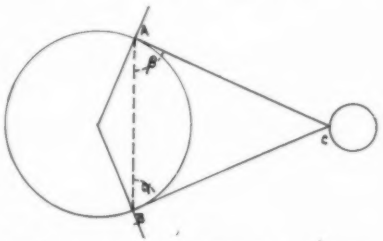


FIG. 7. Measuring the distance to the moon.

Distance to the Sun. You will recall that the data of Aristarchus placed the sun at about 20 times the distance of the moon, but the moon's distance was unknown until the time of Hipparchus. The more exact data of Tycho Brahe indicated that the sun might be many million miles away. A little later Kepler suggested that his data placed it at not less than 16 million miles. Still later Cassini decided it might be as much as 80 million miles away. Bradley's measurements placed it between 94 million and 125 million miles away. During the transit of Venus in 1761, the sun's parallax was fixed at 8.8″ of arc. This placed the sun at nearly 92 millions of miles or at a distance of about 8 light minutes. Further refinement gave this

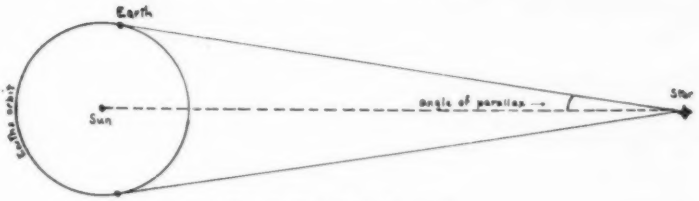


FIG. 8. Parallax of a star.

distance as 92,800,000 miles and its diameter 860,000 miles. The distance to the sun and the velocity of the earth along its orbit having been determined, it was then possible to determine the velocity of light by means of Bradley's theory of the aberration of light, explained in 1727. In this method the ratio of the earth's velocity along its orbit to the velocity of light was put equal to tan α. Then α was found by measurement to be 20.48″ of arc. This gave for the ratio of the velocity of the earth along its orbit to the velocity of light as 1 is to 10,000. Assuming the velocity of light to be 186,000 miles per second, the velocity of the earth is readily computed, and the distance to the sun is found to be 92,780,000. Although the distance to the sun is very much greater than the estimate made by Aristarchus, the estimate of the latter is still regarded as a notable achievement.

Distance to a Star, Parallactic Method. Although the telescope was turned to the heavens on Jan. 7, 1610, it was not until 1838 that the distance to the nearest star was obtained. One reason for this was that the stars are so distant that the refinement needed in measuring angles was too great to be obtained with crude instruments. By 1838 instruments had been perfected to the point where a small fraction of a second of arc could be measured. In that year Henderson, Struve, and Bessel all attempted such a measurement, but the one made by Bessel alone was accepted. He found the annual parallax of 61 Cygni to be 0.3483″. Later Peters found it to be 0.349″. This was a milestone in scientific progress, and indicated that a knowledge of plane geometry and more accurate measuring instruments were the essential elements needed for an exploration of the universe.

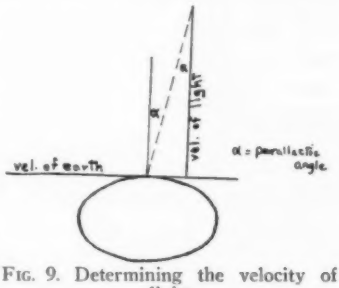


FIG. 9. Determining the velocity of light

(Continued on Page 280)

THE NORRIS SCHOOL

HUGO GIDUZ

ON MY way to the Norris Dam, some twenty miles from Knoxville, Tennessee, I took a "busman's holiday" and visited the school at the town of Norris.

It was somewhat of a surprise to find that the school in such a small rural community was still in session, past the middle of June. What was my even greater astonishment to learn that this school was in session for eleven months of the year!

The school building is a very attractive red brick structure, on an elevation, dominating the centre of the town. It consists of 22 rooms, library, and auditorium. It is the largest building in the world to be entirely heated by electricity. The cost for this heating is about $2,000 a year, I was told. No wonder they use electricity for heating when the cost is so low.

Mr. Glenn Kendall, the Superintendent of Education, spent much time in explaining his system to me. What I shall say is from notes I took while he talked to me. I know that I have not been able to do justice to the Norris School, but I believe that what I have set down will be of interest to those educators who have not had the privilege of visiting the plant.

The school, as mentioned above, runs for eleven months. The teachers are on a twelve months basis. There are classes from the nursery, with unusually adequate equipment for the little ones, through the high school. In fact the training does not even stop with the high school, as I shall show later.

In the high school, in addition to the usual academic courses, there are agriculture, commercial, home economics, and manual arts courses. The remarkable feature of this is that it is done in so small a high school. We more or less expect it in large city systems. Mr. Kendall told me that they try to give each pupil the sort of training for which he is best adapted.

The well-equipped shops are open for the adults of the community each day after three o'clock for about five hours. There is an average of about 20 adults working in these shops every day. I saw evidences of their work there, particularly in the motor boats under construction. These boats will later be launched and used on the lake above the Norris Dam.

Two instructors are in charge of the shops, one for the pupils of the school and one for the adults. The training given in the shops

is meant to go on after the pupils leave school. And many of the adults are interested in learning a skilled trade in order to get better positions with the T.V.A., or elsewhere.

In July and August the school has a camp for boys where they run a modified remedial program for those whose work needs strengthening. The work is done without credit.

There are also two librarians, one for the school and one for the adult group. They assist in the health and recreational programs.

The school is used also for graduate teacher training for the University of Tennessee. There are three internes who receive $40.00 a month and board and room. There is one secondary, one elementary, and one nursery and kindergarten interne. The students assist the critic teachers in the preparation of learning materials, and at the same time get experience in the techniques and methods of teaching in their respective fields. Their work counts towards the degree of M.A., and the preparation of the materials may serve as a basis for their theses.

Another interesting fact is that some of the pupils begin in the high school their training for teaching recreational work. The playgrounds are rather extensive and extraordinarily well equipped for this work.

What struck me most forcibly about the whole system was the fact that the school plant is kept busy almost all of the time. It is more than just a place for the children to attend classes during the day for only a part of the year. From the nursery, with its beds for rest periods, through the high school, with its playgrounds and workships, and beyond into the life of the adults the school strives to educate. The building is in use evenings for community affairs of all sorts. The school belongs to the town, and is available to the residents for whatever needs there may be. It seems to me that this is the ideal way to use the school plant.

As I said earlier, this is an inadequate picture of an interesting project, but I hope that I have been able to suggest at least the wide scope of the Norris School.

The American system of broadcasting, an evaluation of broadcasting from the point of view of the listener, educational broadcasting, and the future of radio have been selected as the topics of the four general sessions. Speeches on these subjects will be made by prominent representatives of education, the radio industry, and the listener, and will be followed by periods of open discussion.

The Mathematics Column

Conducted by H. F. MUNCH

THERE seems to be a lack of reliable information on the part of many people with regard to the tables of dry and liquid measure which should be used in the United States. Recently a mathematics textbook, "designed for the high school pupil who, under school guidance, needs a final year's work in mathematics" and bearing a 1937 copyright, fell into my hands. It was written by two men who are very well and favorably known as writers of high school mathematics textbooks. It is published by one of the large publishers of high school textbooks. The book contained the following table of dry measure:

DRY MEASURE

2 pints (pt.)	=	1 quart (1 qt.)
4 quarts	=	1 gallon (gal.)
8 quarts	=	1 peck (pk.)
4 pecks	=	1 bushel (bu.)
2½ bushels	=	1 barrel (bbl.)

Because when this table was submitted to a number of high school mathematics teachers and to several other people as well for criticism and correction they were not able to point out the needed correction, and because in my teaching of high school pupils they, too, have shown a lack of understanding of this part of the system of measures which is standard in the United States, it perhaps is not out of place to call the attention of the readers of this column to the error involved.

Each line of the table is correct in itself, but there is one line there that does not belong in the table of dry measure which is a part of the system of weights and measures in the United States. The statement 4 quarts = 1 gallon is a part of our system of *liquid* measure. There is no gallon in the United States which is a part of our table of dry measure. The gallon, (in the United States) is a liquid measure. On the other hand there are both a liquid quart and a dry quart. However, these two measures are not the same in size. The United States gallon contains 231 cubic inches. Since there are 4

quarts in a gallon one liquid quart contains ¼ of 231 or 57¾ cubic inches. Since there are 8 quarts in one peck and 4 pecks in one bushel it is evident that there are 32 quarts in one bushel. The standard U. S. bushel contains 2,150.42 cubic inches. Therefore one of these quarts of which 32 make a bushel contains 2150.42 cubic inches ÷ 32. This gives almost exactly 67.2 cu. in. Hence the dry quart is 9.45 cu. in. larger than the liquid quart. This makes the dry quart 16.33+% larger than the liquid quart or approximately ⅙ larger.

When the book above referred to came out the writer, in a letter, called the above facts to the attention of the publishers. They replied to this letter in part as follows:

"The authors have included the gallon in the dry measure because in some communities the gallon is so used and in some states it is a legal measure for certain purposes. However, we recognize your point and in future printings shall take care of this matter in another way."

The statement in this letter that "in some states it (the gallon) is a legal measure for certain purposes" is dodging the issue. Of course it is a legal measure in all states for measuring liquids but not for measuring those things which should be measured by dry measure, beans or peas for example.

Not content with this reply the writer wrote to the National Bureau of Standards at Washington, D. C., stating the case under discussion and quoting the above paragraph from the publisher's letter. The Bureau replied with a two-page letter. Because it, so far as I know, is the highest authority there is on this particular subject it seems well to quote just the last paragraph of this letter. It is as follows:

"In general we may say that we know of no legal basis at the present time for the gallon as a unit of dry measure in the United States. This unit is certainly not recognized by the National Bureau of Standards or by any existing Federal statute or regulation, and as far as we know the same holds true to State and municipal enactments. We are not in a position to say that there is no community in the United States in which a dry gallon differing from the liquid gallon of 231 cubic inches is used, but if such instances exist, it is our opinion that the usage is not sanctioned by law."

This statement is clear and to the point and should settle the matter in the minds of any who may have been in doubt before.

There is plenty of evidence that many people have followed the practice of selling produce by the bushel and then measured it out, giving eight gallons for a bushel. By this practice the buyer got only

(Continued on Page 282)

The Latin Column

Conducted by J. MINOR GWYNN

MATERIALS FOR HIGH SCHOOL LATIN TEACHERS

BENSON W. DAVIS

The purpose of this article is to suggest to high school Latin teachers a minimum list of interesting and worth while books and other materials, together with the names of the places from which they may be obtained. It is not intended that teachers shall buy all the books in any one group, but that they shall use whatever seems best and desirable on the basis of their experience. Therefore this list will probably be more helpful to the inexperienced teacher. It would be well for teachers to own as many as possible of the following titles, and to arrange for the school library to purchase the others:

I. Mythology

Fox, W. S. *Greek and Roman Mythology*, Marshall Jones and Co., Boston, Mass., 1928.

Gayley, Charles M. *Classic Myths in English Literature and in Art*, Ginn and Co., New York, revised edition 1911.

Howe and Harrer, *A Handbook of Classical Mythology*, F. S. Crofts and Co., New York, 1929.

Sabin, Frances *Classical Myths that Live Today*, Silver, Burdett and Co., New York, 1927.

II. Grammar

Bennett, Charles E. *New Latin Grammar*, Allyn and Bacon, New York, 1918.

Gildersleeve-Lodge *Latin Grammar*, D. C. Heath and Co., New York, 1894.

III. Roman History

Caldwell, Wallace E. *The Ancient World*, Farrar and Rhinehart, Inc., New York, 1937

(This excellent work on ancient history will enable the Latin teacher to see the proper position of Rome in the ancient world.)

Frank, Tenney *A History of Rome*, Henry Holt and Co., New York, 1923 and 1928.

IV. Dictionaries

Cassell's *English-Latin and Latin-English Dictionary*, Funk and Wagnalls, New York.

Lewis, C. T. *An Elementary Latin Dictionary*, American Book Co., New York, 1918.

White, J. T. *The White Latin Dictionary,* (Latin-English and English-Latin), Follitt Publishing Co., Chicago, 1933.

V. Periodicals.

1. *The Classical Journal,* F. S. Durham, University of Michigan, Ann Arbor, Mich.
2. *The Classical Weekly,* Casper J. Kraemer, Editor, Washington Square College, New York University, New York.
3. *The Classical Outlook,* American Classical League, New York University, Washington Square East, New York.
4. *The High School Journal,* University of North Carolina, Chapel Hill, N. C.
5. *Education* (The official journal of the N. C. Education Association), Raleigh, N. C.

V. Miscellaneous and general materials:

1. *College Entrance and Regents' Companion to Caesar,* College Entrance Book Co., New York, 1927.
2. *College Entrance and Regents' Companion to Cicero,* College Entrance Book Co., New York, 1927.
3. *Plutarch's Lives* (Everyman's Library Series) 3 vols. E. P. Dutton and Co., New York, 1910.
4. Davis, W. S. *A Day in Old Rome,* Allyn and Bacon, New York, 1925.
5. Mackail, J. W. *Latin Literature,* Chas. Scribner's Sons, 597-599 Fifth Ave., New York.
6. Gray, Mason D. *The Teaching of Latin,* D. Appleton and Co., New York, 1929.
7. Petrie, A. *An Introduction to Roman History, Literature, and Antiquities,* Oxford University Press, New York.
8. The Service Bureau for Classical Teachers, New York University, Washington Square East, New York City, will furnish teachers with catologues of its publications, which offer such teaching aids as maps, charts, models, games, clubs, etc.
9. Blakeney, E. H. *A Smaller Classical Dictionary* (A revision and an enlargement of an older book by Smith. This little book is invaluable to the Latin teacher.) Latest edition, E. P. Dutton and Co., New York, 1934.
10. *An Atlas of Ancient and Classical Geography,* E. P. Dutton and Co., New York, 1928.
11. Sandys, Sir J. E. *A Companion to Latin Studies,* Cambridge University Press, third edition, 1935.
12. Showerman, Grant, *Men and Monuments of Ancient Rome,* D. Appleton and Co., New York and London, 1935.

All Latin teachers should be familiar with the materials that can be obtained from The Service Bureau for Classical Teachers, New York University, Washington Square East, New York City, and should make use of those materials. Every teacher should keep abreast of the times and be keenly aware of the changing trends in education in general and in his or her own field in particular, and should be familiar with the newer techniques and methods in teaching and in testing.

The English Column

Conducted by PRESTON C. FARRAR

WHY SHOULD I cudgel my brains to write an article for the English Column? How many people read these articles? Of those who do, how many are convinced by what they read? Of those who are, how many remember for a month, a year, the ideas the writer has expressed? Of those who do, how many actually apply them in their teaching?

As I sit here on my hill and look out across the lovely country—the golf course, the great green stretch of wooded lowland beyond, where once a Triassic lake seethed and steamed, I can fancy a gigantic struggle in which fifty million years ago Tyrannosaurus Rex, moved by a sense of duty and foreseeing no doubt the need of setting a worthy example to the modern world, is trying to induce a more friendly attitude in his neighbor, Brontosaurus Excelsus, who perhaps occupies more ground than he uses wisely. I see the ingratiating expression on the face of this ancient teacher not unlike the sweet smile of the Japanese minister of war whose portrait adorns this morning's paper. When I contemplate these bygone efforts and think of my own, I am tempted to ask myself,

"Were it not better done as others use,
To sport with Amaryllis in the shade——?"

Which, being properly interpreted, means, Should I not be wiser to join my friends on the golf course, or renew my youth on the tennis court behind my house, or go with the cars speeding along the road to the football game?

For, to give some appearance of educational value to these ruminations and return to the point from which I started, why must we always be writing something supposedly new? I read a bright essay in a current magazine and say, "Not so bad!" Then I take down a book or two from my shelves and find the same thing said fifty years ago, and far more admirably put, by Louis Stevenson or Augustine Birrell.

This attitude, this constant demand for something new, accompanied by unthinking neglect of what is more than a year or two old, is even more noticeable in the world of education than in that of

general literature. In the matter of textbooks this demand comes not chiefly from teachers—it might be a more healthy sign if it did—but from publishers, "productive" college professors, and school authorities. From the instructor-author's point of view the real reason for the "demand" is often little more than the desire for publicity, which he needs for advancement in his profession. From the publishers' point of view the reason is that they must keep the publishing business going and be able to compete in variety and newness with one another. The individual publisher's reason is apparently something like this: "Smith & Co. have a book on that subject; we must have one." The result is an appalling multiplicity of books on the same subject, each of which is heralded as the latest word on the subject and few of which offer any new contribution of value. School authorities tend to confirm this situation by their desire to be up to date. Many of them would not think of considering a book that is ten years old. In regard to some subjects that is almost a necessary attitude, but in other subjects the book that is not looked at at all may be better than the new one that is adopted. I have examined a number of grammars published within the last three or four years. Not one of them presents the subject in such teachable form and in such right order as Buehler's (Part I) published more than thirty years ago.

Of teachers themselves there are a good many so much interested in their work that they are eager and alert for new ideas. Some of these because of insufficient thinking are misled again and again and follow each new fad as it appears. Other teachers, unfortunately many others, soon settle into a comfortable routine and read little, new or old, and think less about the rich possibilities of their work. So easy is it to do this—to follow the line of least resistance, that I have seen student teachers, fresh from a course in methods of teaching English, who if left to themselves would show scarcely any evidence of having had such a course. The chief need of both groups is to bear in mind what they once learned, to apply it, to go back to it and reread it in lecture notes and books, and, most important of all, to think about it in the light of their teaching experience and improve on it wherever they can. In this way they will establish a sound practice based on study, experience, and thought, and will be prepared to read with intelligence and pass discriminating judgment on each new scheme that is proposed for the salvation of our teaching.

The French Column

Conducted by HUGO GIDUZ

The modern foreign languages seem to be taking on a new lease of life in this state. We have recently learned that in both Rockingham and Rocky Mount a third year of French has been added. In Charlotte four years of French are taught. German has also been added in Charlotte. Last year German was added in the Chapel Hill High School.

No doubt there are other schools that have widened the scope of language study. The editor would be glad to learn of any such additions. If we teach in the right way and interest the pupils in our subject there is no doubt that there will continue to be an increased demand for continuing the study of French and adding German or Spanish.

A goodly number of teachers have approached the editor concerning the second year of French. They have been much perturbed because they have not been able to complete Book I during the first year. They want to know what to do about it, for principals seem to feel that they must issue Book II for the second year classes.

Our advice has invariably been to complete the work of the first book before beginning on the second. We should never advance to the more difficult work before being certain that the pupils have mastered the fundamentals. They will have serious trouble in mastering the advanced material without a satisfactory knowledge of the elementary grammar and vocabulary. There is nothing in the State Course of Study that makes it imperative that Book I be used only for the first year and Book II for the second. It is better to have a thorough knowledge of the fundamentals than to rush through the two books. The second should not be taken up until the pupils know what is in the first.

For several years there has been an attempt made to organize a chapter of the American Association of Teachers of French in North Carolina. This has been finally done. Under the leadership of Dr. G. B. Watts of Davidson College the necessary number of mem-

bers was secured at the state meeting of the French teachers in Durham last spring. The officers are as follows: President: G. B. Watts, Davidson College; Vice-President: René Hardré, Woman's College, U. N. C.; Secretary-Treasurer, Lucile K. Delano, Queens-Chicora College.

It is planned to have a meeting of the group, whose membership last May was nineteen, some time in the near future. Teachers of French will find it very much worthwhile to join this association. The *French Review,* the official journal of the A.A.T.F. is sent to each member. For further information write to any of the officers.

Again I want to urge all French teachers to attend their district meetings. It is at these meetings that we can exchange views and get new ideas. The new state adopted texts are still very much discussed when French teachers meet. There was a lively and interesting discussion of the grammars now used, at the Durham meeting. It is through these meetings and discussions that we can best learn what others are doing with the texts, and it is rare that one cannot learn how to improve one's own work.

Professor René Hardré and the editor of this column have just had published a book of French Club Programs which I believe all teachers who conduct French Clubs in their schools will welcome. For further information write either Prof. Hardré or the editor of the French Column.

PHILOSOPHY AND TRENDS OF A MODERN EDUCATION PROGRAM

(Continued from Page 253)

well shown in the various associations of business education. The leadership of your business educators in North Carolina has been outstanding as shown in the construction of your excellent state "Course of Study in Business Education for the High Schools," in your state associational activities, and in the commendable progress which is being achieved in the Southern Business Education Association with which some of your business educators have had much to do. These are signs of great promise for the future of business education in North Carolina, in the South, and in the United States as a whole.

By developing better understanding and sympathetic working relations among school administrators, business leaders, and business teachers, as you fortunately are doing in North Carolina, we may

confidently anticipate a better planned, a better taught, a better supervised and a better administered program of business education in the interest of youth—of young men and women—whom it is ever our especially high privilege to serve.

Note: A second article by Professor Lomax will appear in a subsequent issue.

TRIUMPHS OF EUCLIDEAN GEOMETRY

(Continued from Page 269)

One of the methods now used to determine the distance to a star that is within 100 light years is the following:

Let C be the star whose distance is desired, and D be a very distant star, usually a dim star. When the earth is at B, the angle CBD (i. e. CBF.) is measured many times and the average taken. Six months later, when the earth is at A, the angle CAD is measured. Since line AC||BE, and line AD||BF,

$$\angle\alpha = \angle\alpha',$$

$$\angle\beta = \angle\gamma + \angle\alpha' = \angle\gamma + \angle\alpha$$

$$\therefore \angle\alpha = \angle\beta - \angle\gamma$$

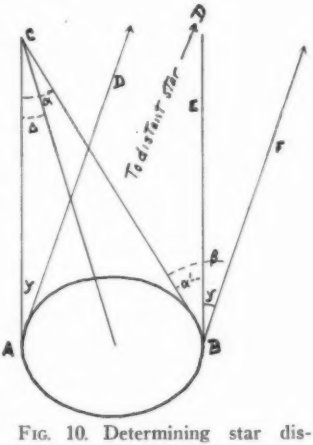


FIG. 10. Determining star distances.

which is the angle subtended at the star C by the diameter of the earth's orbit, namely 186,000,000 miles. In this way the parallactic angle is found. For Alpha Centauri this angle is found to be 0.75″ of arc, which is just about the angle that would be subtended by a length of one inch at a distance of 4¼ miles. This gave the distance to the nearest star as about 26,000,000,000,000 of miles or 4⅓ light years; that is, Alpha Centauri is so distant that light requires 4⅓ years to come from this star to the earth. Since the photographic plate is more sensitive than the human eye, the parallactic method has been used to get the distance of stars as far away as 600 light years. Although the first accurate distance to a star was obtained in 1838, by 1910 the distance to not over 100 stars had been measured. By 1924 Schlesinger's catalogue contained the parallaxes of 1870 stars. Thus once again the theorems on parallel lines had played a major part in determining the distance to the stars—a first step to the interpretation of the universe in which we live.

The mathematical calculations of Adams and LeVerrier led to the discovery of Neptune on the night of Sept. 23, 1846 by the German astronomer Galle. In this discovery the feeling of wonder, admiration, and enthusiasm aroused by this intellectual triumph was overwhelming. Even today it is regarded as a remarkable illustration of the power of reasoning when aided by natural law as expressed in terms of theorems and equations. In like manner the calculations of Lowell on the perturbations of Neptune led to the discovery of the planet Pluto in January 1930.

Another of the theorems of Euclid that has been very prolific in science is: "Similar surfaces are to each other as the squares of their like dimensions." At first thought, this theorem is very innocent, and possibly very useless. It surely can not compare with the Pythagorean theorem in its important terrestial applications. When this theorem is applied to the intensity of light, the force of gravitation, or radiant energy, it means that the intensity varies inversely as the square of the distance from the source. This is the geometric principle which underlies the laws of Kepler, and Newton's law of universal gravitation. It is the latter law which governs the heavenly bodies in their orbits, and accounts for the tides and for the Chamberlain-Moulton theory of the origin of the solar system.

Cepheid Variables. About 1912, Miss Leavitt of Harvard noticed that certain stars, called "Cepheid Variables," pulsate in given periods and that all stars having a given period give off the same amount of light. These variables are very numerous, some being near and others in the most distant nebulae known. Since the distance to the nearest of these Cepheids had been measured by geometric or trigonometric methods, it now becomes easy to determine the distance to others. Consider a Cepheid variable star lying at a distance of 100 light years and having a given period of variation. If a second Cepheid having the same period of variation, is found to be ¼ as bright, then it must be twice as far away. If it gives $\frac{1}{100}$ as much light it must be 10 times as far away, etc. By this method it is found that the clusters of stars, 100 in number, all lie between 20,000 and 200,000 light years of the solar system. Of the two million or more nebulae within the range of the telescope the nearest one is 850,000 light years away; the second nearest, the Andromeda nebula, is 930,000 light years away; and the distance to the farthest nebulae now photographed is 300 million light years.

In the theory of the evolution of the solar system according to the planetesimal hypothesis, if two great suns approach each other, the tide-raising force varies directly as the radius of the disturbed

body and inversely as the cube of the distance of the disturbing body. If these bodies approach near enough to each other, one or both of them will be torn asunder and matter will be pulled out by tidal action, and form along the arms of a spiral nebula. In the range of the telescope there are probably a million of these spiral nebulae showing the various stages of evolution varying from a gaseous mass to a spiral nebula in its well advanced stages, like the solar system.

Thus we see that geometry has aided astronomy in each of its three well marked periods, namely (1) observational period, lasting from 600 B.C. down to and including the time of Kepler; (2) analysis and generalization period, when the genius of Newton generalized a huge mass of facts and expressed the result in the formula of gravitation; (3) the period of deduction, in which, from a knowledge of the position and movements of the heavenly bodies in the past, it was found possible to predict their future courses, the time of eclipses, the time of the return of the comets, the position of a planet and the discovery of new planets, all of which emphasized the idea of natural law. This might be called the evolutionary period, since one of its dominant aims has been to show how the solar system has come to be what it is. Take it all in all, Euclidean geometry (tenth grade) has played a large part in five of the major accomplishments of the human race, namely: 1. The establishment of the heliocentric theory, 2. The determination of the velocity of light and other ether waves, 3. The establishing of the law of gravitation, 4. The determination of the distance and size of the solar system, the stars, and the nebulae, 5. The acceptance of belief in natural law, 6. The idea of evolution.

THE MATHEMATICS COLUMN

(Continued from Page 273)

$231 \times 8 = 1848$ cubic inches, whereas he should have received 2,150.42 cu. in. Thus it is evident that he was short at least 302.42 cu. in. for each bushel purchased. In other words he received approximately $\frac{5}{6}$ of a bushel instead of a bushel.

It is hoped that this discussion will serve to call the attention of teachers to this matter and that they will place due emphasis on it in their teaching, to the end that the oncoming generation may use our measures correctly.

BOOK REVIEWS

Ways of Thinking and Writing. FRANK W. CUSHWA AND ROBERT N. CUNNINGHAM of Phillips Exeter Academy. Charles Scribner's Sons.

Here is something new in English textbooks, and something admirable. It is the kind of thing that has been sorely needed and that has been a long time coming. Its chief distinction is that it puts its main emphasis on thinking rather than on manner of expression. It is a practical textbook for training young people to do not only orderly thinking but sound thinking, for the two are by no means the same thing.

Part I is a collection of essays dealing with many aspects of contemporary life, accompanied by abundant questions and exercises, which when used in connection with Part II serve as a guide to discriminating interpretation and accurate reasoning. The first section of Part II gives brief summaries of principles of psychology and logic that should serve as aids to thinking. The next section consists of suggested aids to reading, writing, and discussion, with many exercises and assignments. This is followed by a long section of supplementary studies which bring the student much new and interesting material for discussion and writing and give him opportunity for extensive practice in thinking. After an excellent list of books for reference the volume concludes with a concise handbook of composition.

Ways of Thinking and Writing is, then, an unusual combination of composition textbook for advanced classes, reference handbook of rhetoric, and essay anthology. But more than these it is a practical guide to sound thinking, with abundant material and suggestions for practice. The mere reading of the skillfully chosen essays and briefer selections ought to be a rich educational experience for intelligent students; and if the book is adequately taught, it ought to do more than any other book that I have seen to develop in young people the ability to do the kind of thinking and to induce in them the attitude that will give them intelligent satisfaction in life and render them able to perform rationally their functions as citizens. But it will have to be taught well, and it cannot be taught well by teachers (of whom unfortunately there are too many) who have not themselves learned to think. For that very reason they—in fact, all English teachers ought to read the book with care. It would at least open their eyes to some of the unrealized opportunities of their positions.

As the book is not an easy one and requires considerable maturity in the reader, it ought not to be tried below the senior year of the high school; and in those sections of the country where the elementary and high school courses cover only eleven years, it might be a mistake to attempt it except with unusually able senior classes. In fact, the book is admirably suited for the work of the freshman year in college; for few entering students have had the kind of training that it offers, and all students should have that training at some time or other. Even the college graduate who has never had a course in logic or has forgotten or failed to apply the one he had and the general reader could profit greatly by a careful reading of *Ways of Thinking and Writing.*

P. C. F.

The Study of English Literature. COWARDINE AND MORE. Henry Holt & Co. 455 pp. $1.60.

According to the statement of the authors the purposes of this book are (1) "to help students in public high schools and private academies who are trying to meet the increasingly difficult requirements of the college entrance examinations in English, and (2) to make the study of literature more interesting and vital to those whose formal education will stop when they graduate from the secondary school." The book ought to help in the attainment of both of these aims. It is not specifically a book for the guidance of high school pupils in the study and enjoyment of literature; that is, it does not show them how to understand and enjoy literature—if any book can do that. It is by no means a book for the guidance of teachers in their efforts to bring about that result; it says nothing of methods of teaching. It is rather a book of talks or discussions about the characteristics of literature, a book about principles of literary criticism.

After some consideration of the general nature and value of literature and the choice of books, the authors discuss such topics as subjectivity and objectivity in literature, classicism, pseudo-classicism, romanticism, idealism, realism, naturalism, and the characteristics and technique of the different kinds of poetry and prose. All this is interesting to a mature reader. How much it will interest high school students will depend largely on the skill with which it is taught.

If it is taught as a body of facts and principles laid down authoritatively for pupils to learn, the chances of arousing interest are not likely to be great. But if the material of the book is kept constantly subordinate to the literature that the class is reading and is applied to it in open-minded discussion, the likelihood of success ought to be much greater. Appreciation of literature cannot be handed down from above. It must be built up from the level of the pupil's interests. Neither can it be developed much by classifying and characterizing the literature read or by learning the old traditional terms long ago discarded by progressive teachers. Such words as *catalectic, hypercatalectic, apocope, anacrusis* are more likely to interfere with the appreciation of poetry than to increase it. Incidentally, if the order in which the different parts of the act of scanning are given on page 210 is intentional, that surely is exactly the wrong order in which to teach a young person to scan. If the thing is to be done with intelligence, the marking of the accents should come first and the division into feet last. But these are minor faults in a book which has much to commend it.

P. C. F.

The New Comprehensive Standard School Dictionary. Edited by FRANK H. VIZETELLY AND CHARLES E. FUNK. Funk and Wagnalls Co. New York. 1937. Pp. 1008 + XIV. $1.32.

This book gives the spelling, syllabication, pronunciation, and etymology of 50,000 words and phrases. These terms have been carefully chosen to the end that the book may serve well the needs of the school children of America. This material is all alphabetically arranged so that it may be easily found by anyone able to use a dictionary at all. There are no appendices. The pronunciation of each word is given by two different methods of diacritical nota-

tion. The first, which is the one adopted by the Department of Superintendence of the N. E. A. and endorsed by other educational and scientific organizations, is usually considered the simplest and most efficient method of indicating the pronunciation of words that has yet been devised. The second is the older and more conventional method. The definitions are reduced to their simplest terms. However, they will usually be found adequate.

There are a number of noteworthy features of the book. It is an outstanding example of the best in the art of book making; the paper is strong and durable; the binding is excellent; the type is legible. The amount of reference material such as the tables of weights and measures and their equivalents is unusual and will be of great value to the student. The pictorial illustrations are numerous and well chosen to aid the reader in getting clear notions of the meaning and significance of the printed material.

It seems that the writers and publishers have exhausted present day resources in making this book as valuable and as practical as could be done when the price and scope of the book are considered.

H. F. M.

Workbook to Practical Mathematics. N. J. LENNES, The Macmillan Company. 1937. 160 pp. 60c.

This workbook is especially designed for use with Practical Mathematics which was written by the same author. It contains much valuable drill material, well arranged and well synchronized with the material of the text. Individual needs are met by providing "special practice" work for those pupils who need drill on the simpler phases of the work, "optional" work for the gifted pupils, and adequate drill for the great rank and file of pupils of average ability. Emphasis has been placed upon business forms and upon the graph. The book would be an incentive to some students to work many problems and thus to master the fundamentals of the subject.

H. F. M.

Snakes Alive and How They Live. CLIFFORD H. POPE. The Viking Press. 1937. xii + 238 pp. $2.50.

I have just finished reading Pope's *Snakes Alive*, and became quite cognizant of the fact that all of the four great groups of poisonous snakes of the United States occur within the boundaries of North Carolina. For that reason perhaps we should become a snake-conscious people. Not that I have any desire to increase enmity for all snakes—but rather to encourage discrimination between the poisonous types and the non-poisonous which, though often useful, are ruthlessly destroyed.

There are chapters dealing with reproduction, growth rate, size and age of snakes; others describe their locomotion, defense, venoms, and enemies; still others deal with popular beliefs and the use of snakes in medicine. There is also a simple classification key for the snakes of the United States. The book is amply illustrated with excellent half-tones.

This volume will make interesting reading for the non-technical reader, but at the same time will serve as an excellent handbook for the amateur interested in snakes. It should be on the shelves of many of our school libraries, especially those in rural schools.

BERT CUNNINGHAM, *Duke University*

The Audio-Visual Handbook. ELLSWORTH C. DENT. Society for Visual Education, Chicago. 1937. 181 pp. Paper, $1.25, cloth, $1.75.

The author's earlier "Handbook" has here been brought as nearly up to date as is possible considering the rapidity of changes and improvements in his general field. In this edition aids through sound as well as sight, and a combination of the two, are treated,and broadly so. Under purely visual aids, for example, the proper functions of all the following are discussed: the demonstration experiment and the blackboard; the school journey (field trip); plays and pageants; objects, specimens, models; the school museum; graphs and charts; maps and globes; sand table; photographs and prints; opaque projection; stereographs and stereoscope; glass slides and slide-making; filmslides; the silent motion picture.

The "Handbook" should prove very valuable as a source book of information about both the securing and handling of the kinds of materials discussed. At the same time it considers, quite impartially it seems to this reviewer, the merits and drawbacks of each type within the three classes mentioned, and points out that each has a place to fill in the educational process.

C. E. P.

New World of Chemistry. BERNARD JAFFE. Silver Burdett Company. 1937. 566 + xxx pp. $1.80.

A second edition of this popular text, brought to more recent date. Specific changes include consideration of the neutron as part of the atomic structure, this involving corresponding change in the atomic diagrams; improving the form of writing ionic equations; giving a more recent chart and more recent statistics of nitrate consumption; adding facts and illustrations showing new developments in glass manufacture; recording the recent isolation of Vitamin E and of the hormone *androsterone.*

C. E. P.

Safety and Health of the School Child: A Self-Survey of School Conditions and Activities. JAMES F. ROGERS, M. D. Pamphlet No. 75, U. S. Office of Education. 1937. 29 pp. 10 cents.

This treats in question form, without attempting a rating scale: (1) conditions of the school plant; (2) mental conditions of the school influencing health; (3) bodily conditions of the child affecting his life and health and that of others; (4) teaching staff—its personnel and health.

C. E. P.

An Annotated Bibliography on the Education and Psychology of Exceptional Children. ELISE H. MARTENS AND FLORENCE E. REYNOLDS. Pamphlet No. 71, U. S. Office of Education. 1937. 42 pp. 10 cents.

The lists are classified under the following heads: (1) general reference; (2) blind and partially seeing children; (3) crippled children; (4) deaf and

hard-of-hearing children; (5) delicate children (or children of lowered vitality); (6) gifted children; (7) mentally retarded children; (8) socially or emotionally maladjusted children (a. general principles, b. clinical activities, c. research activities); (9) speech defectives.

C. E. P.

Who Are You? Individualized Group Guidance. EARL W. SEIBERT. Published by the author (address: Hershey, Pa.) 1937.

These two phamplets are the outgrowth of the Hershey, Pennsylvania, High School guidance program. The former (32 pp., 25 cents, $20.00 per hundred) is for student use; the latter (40 pp., 50 cents) is a leader's manual. They are intended for use in a guidance program in schools where expense prohibits complete individual counseling. The material is centered round three objectives: (1) an understanding of self; (2) an understanding of the world; (3) a philosophy of adjustment. Helpful especially to smaller schools.

C. E. P.

Preview of Mathematical Analysis. FREILICH-SHAUKOLB-MCCORMACK. Silver Burdett Company. 1937. vi + 137 pp. $.60.

This monograph is written for students of advanced high school mathematics. It consists of three chapters, as follows: Chapter I, Theory of Equations; Chapter II, Permutations, Combinations and Probability; Chapter III, Differential Calculus. These topics are presented to the student very simply and clearly, bringing their work well within the range of ability of the high school senior who has had adequate preparation and whose interests and aspirations carry him in this direction. However it is doubtful if this book will find any very large place in the average high school.

H. F. M.

Mathematics for Modern Life. JOSEPH P. MCCORMACK. D. Appleton-Century Co. 1937. xv + 448 pp. $1.32.

This book is designed for use in the eighth or ninth grade. It is largely algebra although it contains considerable amounts of arithmetic and intuitive geometry with just an introduction to demonstrative geometry. The approach to algebra is very gradual and well motivated. In fact the interest of the pupil has been consistently appealed to throughout the whole book. This is done through the pictures, cuts, diagrams, and the history of mathematics, but especially through the problem material. There are many helps to teachers in meeting the problem of individual differences such as excellent explanations of the new material at the pupils' level of understanding and carefully graded exercises at three levels of difficulty. The author has arranged the easier and more practical material near the beginning of the book with the more technical parts in the later chapters. Some of the more unusual features of the book are its treatment of logarithms and the slide rule. There are many new type tests that would permit the pupil, at least to some extent, to measure his mastery of the materials studied. The mechanical features of the book are good.

H. F. M.

Twenty Short Stories of America. EDITH MIRRIELEES. D. C. Heath & Co., 1937. xiv + 381 pp. $1.24.

A collection intended for use in junior high grades. The title, "Stories of America," must be broadly interpreted. The setting is usually American, as are the authors; but against it are given folk tales, "tall stories," and stories of animals as well as of incidents at least potentially historical. "Their chief bond of union is this: Every one, including the least realistic, contains an emotional situation which boys and girls can recognize as real, and which, to the extent that they do recognize it, provides them with understanding and power of adjustment in the situations they must themselves meet."

C. E. P.

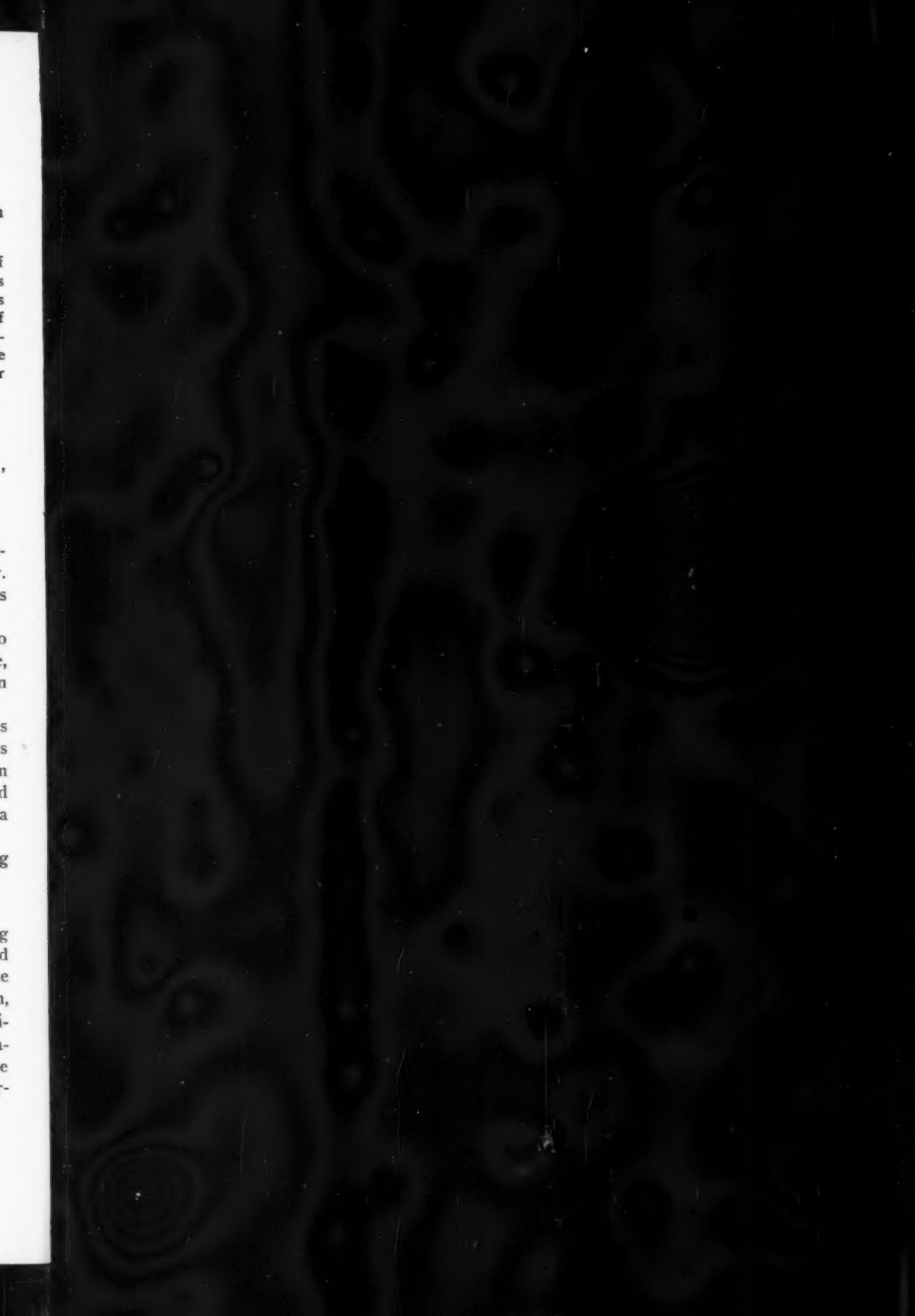
Other publications recently received:

University of the State of New York, Bulletin No. 1113 (Apr. 1, 1937). *Mathematics for Elementary Schools.*

The University of North Carolina Extension Division has recently established an educational film library loan service. Mr. Charles F. Milner, formerly a science teacher in Greensboro, has been placed in charge.

Sound and silent motion pictures and lantern slides designed to supplement classroom instruction will be selected and made available, on a nominal rental plan, to schools, colleges and adult education groups.

The bureau is prepared to provide a number of advisory services including the selection of visual education equipment, suggestions to teachers regarding the use of visual aids, and information on sources of films and other material. Schools not at present equipped with projectors may secure this equipment from the bureau on a rental basis.

A catalogue announcement of the services of the bureau is being distributed.

The Second National Conference on Educational Broadcasting will be held at the Drake Hotel, Chicago, November 29, 30, and December 1. Over twenty national organizations, including the National Education Association, American Library Association, American Association for the Advancement of Science, National University Extension Association, and American Public Health Association, are listed as its sponsors. Dr. George F. Zook, President of the American Council on Education, will again act as Conference Chairman.